Claims

1. Electrochromic display element containing an electrochromic medium between two electrode sheets, where at least one of the electrode sheets is transparent and has a transparent, electrically conductive layer, characterized in that the transparent electrode sheet or sheets has/have a periodic or aperiodic pattern of strips or grid made of a material having metallic conductivity.

2. Electrochromic display element according to Claim 1, characterized in that the electrochromic medium is a solution, a gel or a solid.

3. Electrochromic display element according to Claim 1 and 2, characterized in that the electrochromic medium contains at least one pair of redox substances of which one is reducible and the other is oxidizable, where both are colourless or only slightly coloured and one substance is reduced and the other is oxidized on application of a voltage to the display element, with at least one becoming coloured, and after switching off the voltage the two original redox substances are formed again and the display element decolorizes.

4. Electrochromic display element according to Claim 3, characterized in that

a) the reducible substance has at least two chemically reversible reduction waves in the cyclic voltammogram and the oxidizable substance correspondingly has at least two chemically reversible oxidation waves, or

b) the reducible substance and the oxidizable substance are covalently bound via a bridge B, or

c) the reducible and/or oxidizable substances selected are ones in which the reversible transition between the oxidizable form and the reducible form or vice versa is associated with the breaking or the formation of a σ bond, or

d) the reducible substance and the oxidizable substance are metal salts or metal complexes of metals which exist in at least two oxidation states, or

e) the reducible and/or oxidizable substances are oligomers and polymers which contain at least one of the redox systems mentioned or else pairs of such redox systems as are defined under a) to d), or

f) the reducible and/or oxidizable substances used are mixtures of the substances described in a) to e), provided that these mixtures contain at least one reducible and at least one oxidizable redox system.

Sub a1

5. Electrochromic display element according to one or more of Claims 1 to 4, characterized in that both electrode sheets have a periodic or aperiodic pattern of strips or grids made of a material having metallic conductivity.

Sub C1

6. Electrochromic display element according to Claim 5, characterized in that the lines of the pattern of strips of the two electrodes form an angle with one another.

Sub a2

7. Electrochromic display element according to one or more of Claims 1 to 6, characterized in that the pattern of strips or grid made of the material having electrical conductivity is aperiodic on at least one electrode.

Sub C2

8. Electrochromic display element according to Claim 7, characterized in that the periodicity of the pattern of strips or grid on at least one electrode is restricted to a very short distance.

Sub a3

9. Electrochromic display element according to Claim 7 or 8, characterized in that the arrangement of the aperiodic grid is such that the mean of the distance between two neighbouring points of intersection of the grid, taken over all points of intersection of the grid, corresponds to the dot spacing a of a periodic dot grid having the same size and the same number of grid points and in that the autocorrelation function of the grid decreases rapidly in all directions for values which are greater than a.

10. Electrochromic display element according to one or more of Claims 1 to 9, characterized in that the metal grid or pattern of strips on the electrode or electrodes is deposited on the transparent, electrically conductive layer.

11. Electrochromic display element according to one or more of Claims 1 to 10, characterized in that the transparent, electrically conductive layer on the electrode or electrodes is deposited on the metal grid or pattern of strips.

12. Electrochromic display element according to one or more of Claims 1 to 11, characterized in that the grid or pattern of strips of at least one electrode has a minimum mesh spacing of 3 mm.

13. Electrochromic display element according to one or more of Claims 1 to 12, characterized in that the grid or pattern of strips has a maximum optical density of 0.3.